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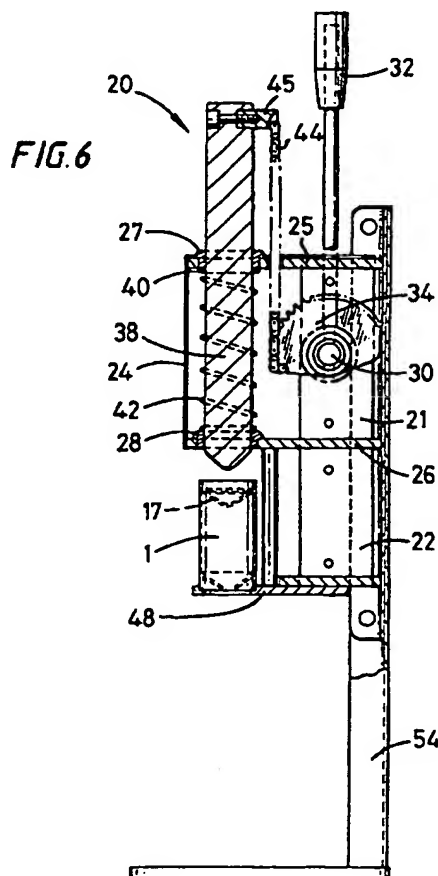
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(54) Abstract Title

Frozen dessert dispensing system

(57) A dispensing system for frozen desserts includes a plurality of containers and a dispensing device. Each container contains an individual portion of frozen dessert, and includes a substantially cylindrical tube 1 having a nozzle towards one end (2), and a piston (8) located between the nozzle and the other end with the dessert between them. The dispensing device includes a plunger 38 mounted for reciprocating movement along a longitudinal axis, a drive means including a sprocket 34 and a chain 44 for driving the plunger 38 along the axis, and a support means 48 for supporting the nozzle end (2) of the container with the plunger 38 in engagement with the piston (8). With the container located on the support means 48, the individual portion of frozen dessert may be dispensed by operating the handle 32 to rotate the sprocket 34.



At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

This print takes account of replacement documents submitted after the date of filing to enable the application to comply with the formal requirements of the Patents Rules 1995

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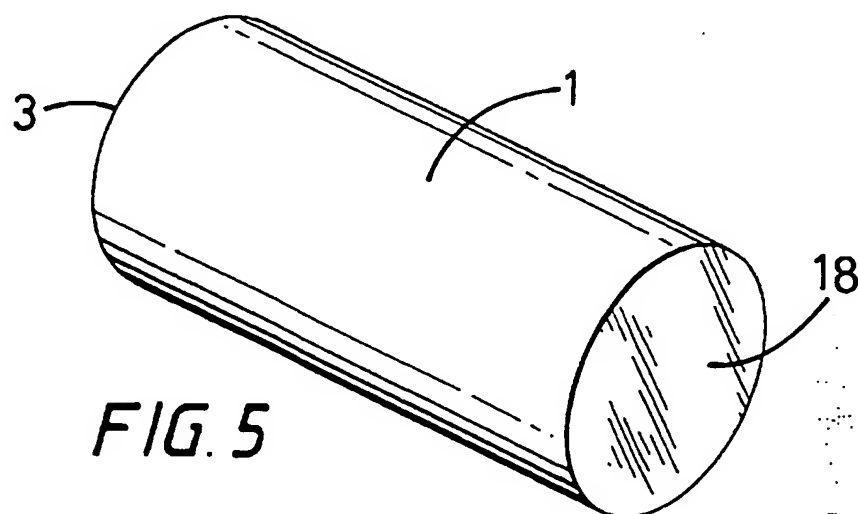
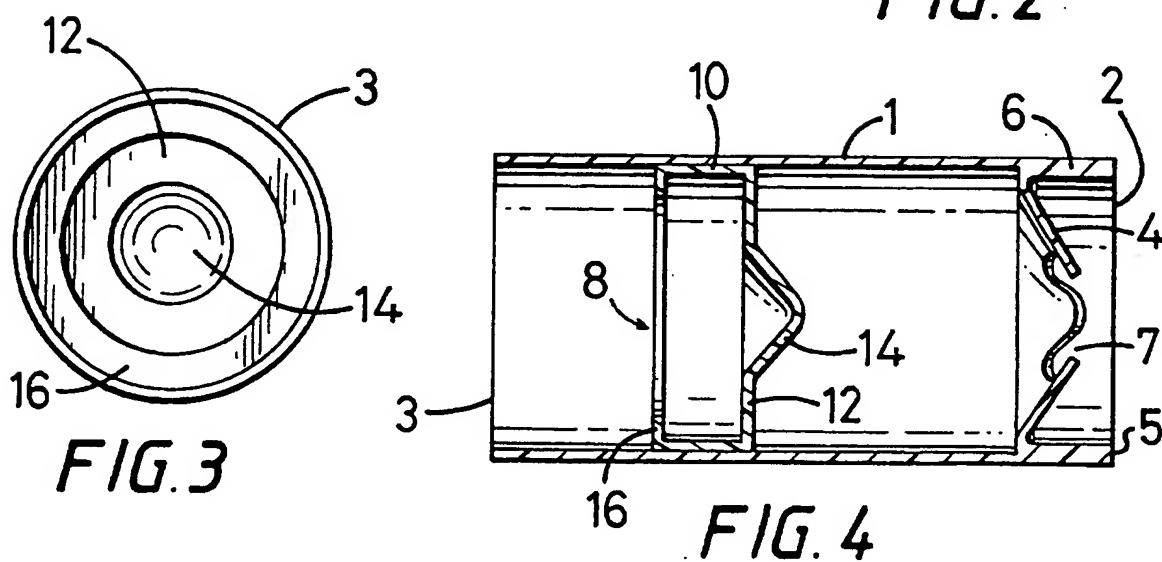
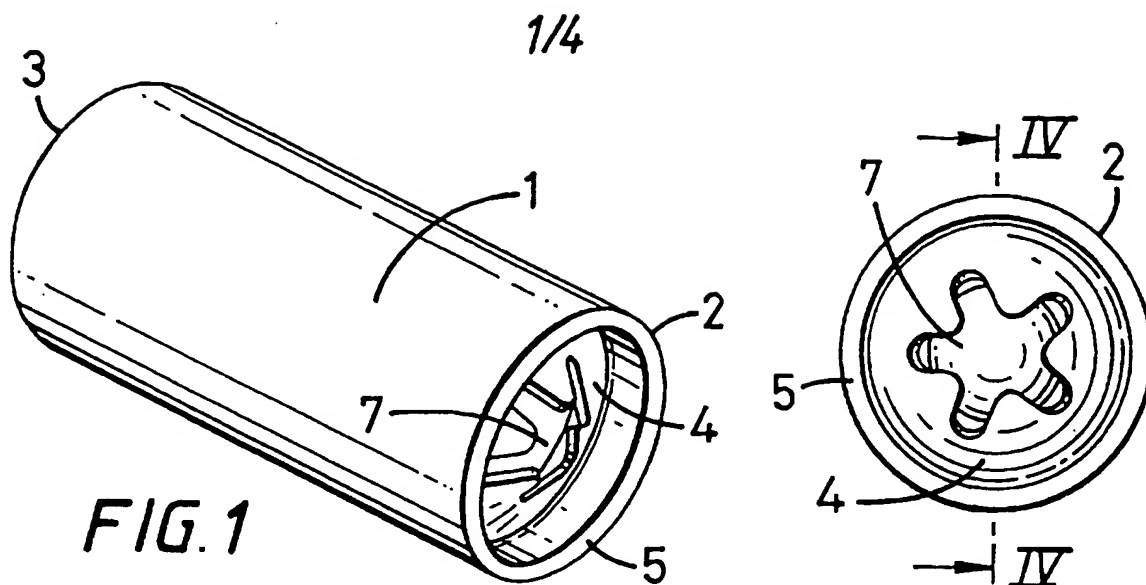
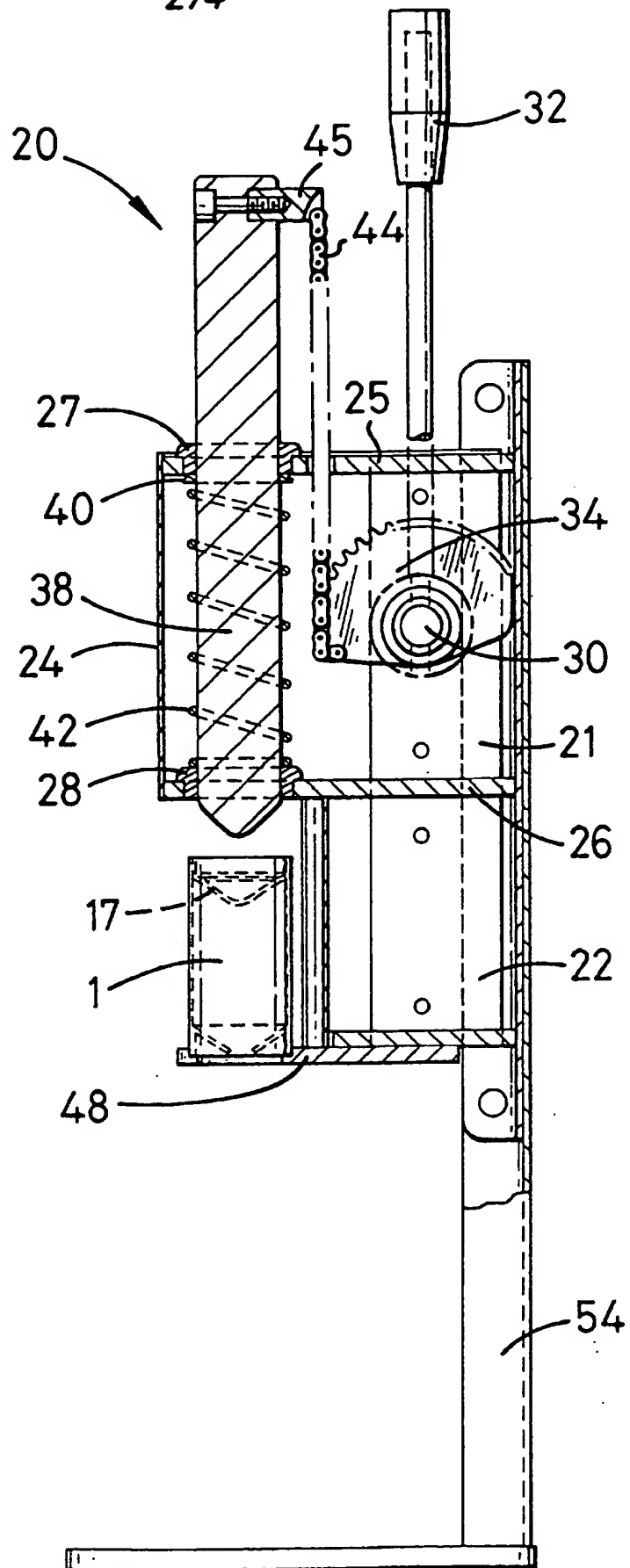


FIG. 6



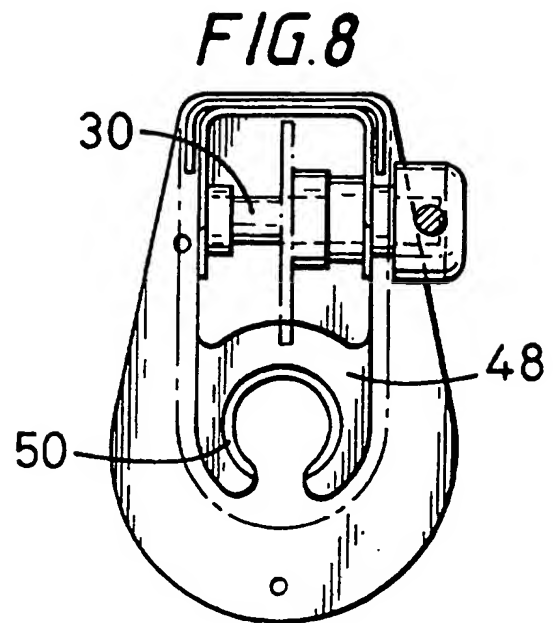
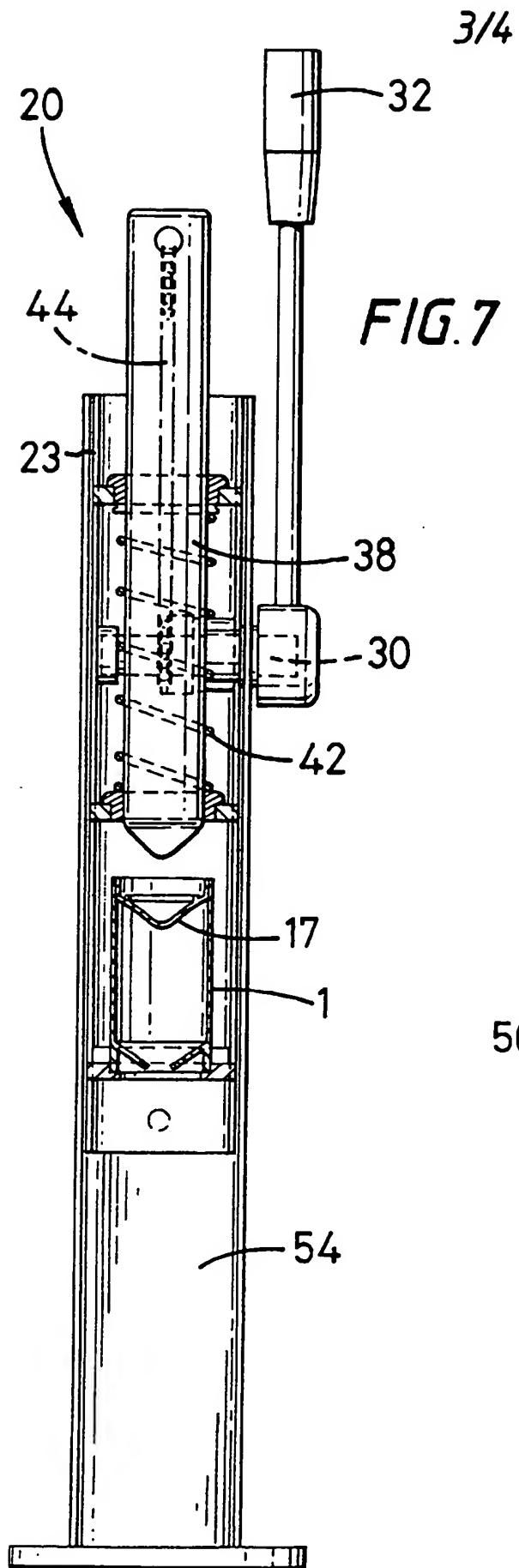


FIG. 9

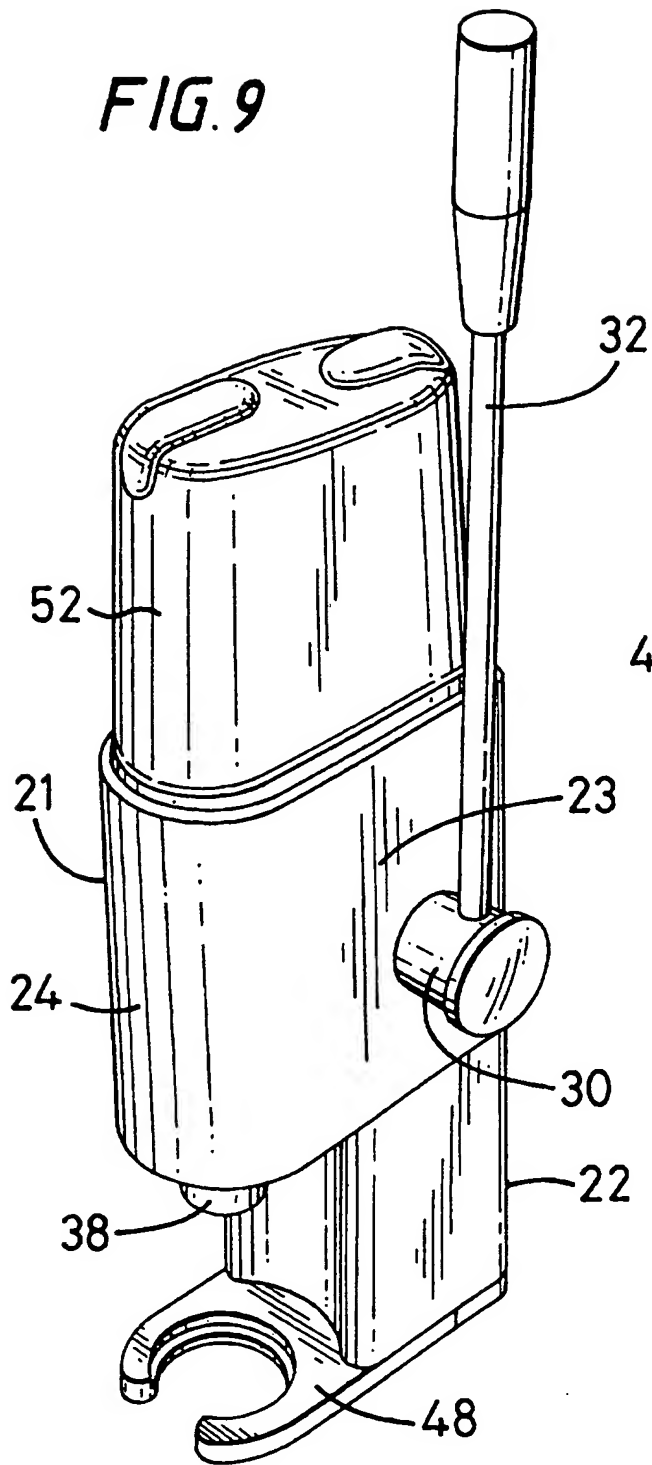


FIG. 10

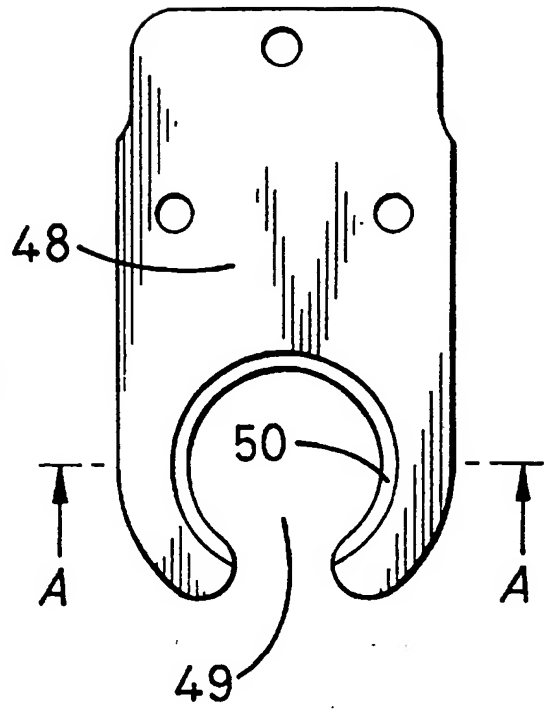
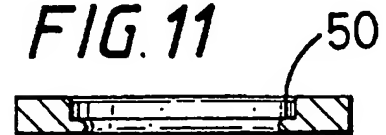


FIG. 11



## FROZEN DESSERT DISPENSING SYSTEM

The present invention relates to a dispensing system for frozen desserts and to a dispensing device for use in such a system. In particular, but not exclusively, the invention relates to a dispensing system for ice-cream, frozen yoghurt and sorbets, including a plurality of containers, each containing an individual portion of the frozen dessert, and a  
5 dispensing device for dispensing the dessert from the container into a serving dish or wafer cornet. In particular but not exclusively the invention relates to an ice-cream dispensing system for use by ice-cream sellers, and in restaurants and fast food outlets.

Commercially, individual portions of ice-cream may be dispensed using a soft-serve  
10 machine, in which the ice-cream is mixed and frozen in bulk. Alternatively, ice-cream may be dispensed using a dispensing machine from a pre-filled bulk container, as for example in the dispensing system described in WO 94/14333. These dispensing systems have disadvantages for both retailer and customer. There is no control of the size of the individual portions dispensed, and if not all the ice-cream is sold within a certain time  
15 period, there is the possibility of deterioration of the bulk product. The dispensing machines are expensive and bulky, and normally dispense only one flavour.

Individual portions of ice-cream also may be dispensed from large tubs using scoops. Although customers have a choice of flavours, this method of dispensing ice-cream is slow and time consuming. Again there is no control of the size of the individual portions  
20 dispensed, and there is a possibility of deterioration of the bulk product if not all the ice-cream is sold within a certain time period. This method of dispensing ice-cream can also be less hygienic than machine dispensing.

Individual ice-creams may also be sold in pre-packaged portions. This alleviates the problem of portion control, however it cannot be readily used in certain commercial  
25 outlets, for example restaurants, since the portion cannot generally be presented attractively.

A device and a method for dispensing individual portions of ice-cream is described in WO94/13154. Ice-cream is supplied in containers, each of which contains an individual portion of the ice-cream. The containers are filled through an open end which is then

sealed with a closure member. The containers are preferably hemispherical in shape or alternatively may be of a truncated cone shape with the side walls tapering inwards towards a circular base. When required, a container is placed in a discharge unit, including a plunger of corresponding shape. The plunger is activated, deforming either the container  
5 or the closing member and the product is discharged through an outlet either in the closure member or in the container.

There are, however, a number of disadvantages with this dispensing system. The dispensing mechanism is complicated and expensive. The system is not suitable for manual operation due to the large force, in the region of 30-40psi, that is required to  
10 dispense the ice-cream from the container. The container is shaped like a tub. This results in the possibility of customers assuming that they have purchased a tub of ice-cream, rather than a ice-cream that needs to be dispensed from the container. The shape of the containers makes stacking difficult and results in a poor use of space. The containers are also difficult to fill resulting in the presence of air pockets within the ice-cream.  
15 Furthermore, the outlet is so small that only ice-cream without particulates can be dispensed. The container is deformed during the discharge process, preventing the container from being reused. The container does not always deform as intended, resulting in unreliable operation. It is also difficult to expel all the ice-cream from the dispenser.

The above-mentioned disadvantages are largely mitigated by the inventor's dispensing  
20 system described in European patent application No. 98119961.5, which includes a plurality of ice cream containers, each of which contains an individual portion of ice cream, and a dispensing device. Each container includes a cylindrical tube having a nozzle at one end and a piston that can be driven along the tube to extrude the ice cream through the nozzle. The dispensing device includes a plunger that is mounted for reciprocating  
25 movement, a manually-operated handle for driving the plunger downwards and a support for the container. With the container located on the support means, the ice cream is dispensed by operating the handle to drive the plunger downwards against the piston, so extruding the ice cream from the container.

In the inventor's earlier system described above, the operating handle is connected to the  
30 plunger through a pivoting arm that rotates with the handle. The inventor has found that

while this arrangement is generally satisfactory, it is difficult in practice to exert an even pressure on the piston. This can result in an uneven flow of ice cream through the nozzle, leading to an unattractive presentation. In an alternative arrangement also described in the inventor's above-mentioned patent application, the handle drives the plunger through a flexible cord that is connected to the handle via a rotatable quadrant. Although this arrangement gives better flow control, the inventor has found that it is not sufficiently robust and reliable and can suffer, for example, from breakage of the cord.

It is an object of the present invention to provide a dispensing system for frozen desserts, and a dispensing device for dispensing frozen desserts, that mitigates at least some of the above mentioned problems.

According to the present invention there is provided a frozen dessert dispensing system, said dispensing system including a plurality of containers and a dispensing device, each container containing an individual portion of frozen dessert and including a substantially cylindrical tube having first and second ends, a nozzle means towards said first end, a piston means located between said nozzle means and said second end, said piston means being adapted for sliding movement along the tube, said individual portion of frozen dessert being contained within the cylindrical tube between said nozzle means and said piston means, said dispensing device including a plunger means mounted for reciprocating movement along a longitudinal axis, a drive means for driving said plunger along said axis, a support means for supporting said first end of said container with said plunger in engagement with said piston means, the arrangement being such that with said container located on said support means, the individual portion of frozen dessert may be dispensed by actuating said drive means, said drive means including a chain attached to said plunger, a rotatable sprocket member engaging said chain and actuating means for rotating said sprocket member to drive the plunger along said axis.

Use of a chain and sprocket drive makes it easy to exert a steady pressure on the piston, ensuring good flow control. The mechanism is also extremely robust and reliable.

Advantageously, the actuating means includes a manually-operated handle connected to the sprocket member for rotation therewith.



The dispensing system allows individual portions of ice-cream to be dispensed easily and attractively into either a cornet or a bowl. This system provides a choice of flavours, quantity control of portion size, improved hygiene, and the ice-cream is dispensed quickly and efficiently.

- 5 Advantageously the individual portion of ice-cream lies in the range 100ml - 250ml, and preferably in the range 125ml - 200ml.

Advantageously the container is sealed with a removable cover. The removable cover seals the container until it is required thereby reducing the chance of contamination.

- Advantageously the container is rigid and does not deform or collapse during the  
10 dispensing process. Preferably the container is made of high density polyethylene.

Advantageously the diameter of the plunger is slightly less than the internal diameter of the cylindrical tube of the container.

- According to a further aspect of the present invention there is provided a dispensing device for dispensing frozen desserts, said dispensing device including a plunger means  
15 mounted for reciprocating movement along a longitudinal axis, a drive means for driving said plunger along said axis, and a support means for supporting a container containing frozen dessert in engagement with said plunger means, said drive means including a chain attached to said plunger, a rotatable sprocket member engaging said chain and actuating means for rotating said sprocket member to drive the plunger along said axis.

- 20 Advantageously, said actuating means includes a manually-operated handle connected to the sprocket member for rotation therewith.

Embodiments of the invention will now be described, by way of example, with reference to the accompanying drawings of which :

Figure 1 is a perspective side view of a container;

- 25 Figure 2 is an end view of the container from a first end;

Figure 3 is an end view of the container from a second end;

Figure 4 is a side view, in cross-section, of the container on line IV-IV in figure 2;

Figure 5 is a perspective side view of the container with a cover seal;

Figure 6 is a side view, in cross-section, of a dispensing device;

Figure 7 is a front view, in cross-section, of the dispensing device;

5 Figure 8 is a top view of the dispensing device, showing hidden details;

Figure 9 is a perspective side view of the dispensing device;

Figure 10 is a top view of a support base, being part of the dispensing device; and

Figure 11 is a cross-section on line A-A of Figure 10.

As shown in figures 1 and 4, the ice-cream container consists of a cylindrical tube 1 with  
 10 first and second ends 2, 3. A conical nozzle 4 partially closes the first end 2 of the  
 cylindrical tube 1. The tube extends beyond the nozzle and has an end face 5 for engaging  
 a support. The wall of the end part 6 that extends beyond the nozzle 4 is slightly thicker  
 than the wall of the rest of the tube, increasing the strength of the end part 6. The nozzle  
 4, which is shown in more detail in figure 2, includes a star-shaped aperture 7. This  
 15 produces an attractive decorative pattern on the surface of the ice-cream as it is extruded  
 through the nozzle 4, and allows the extruded ice-cream to flex so that it may be served  
 easily in either dishes or cornets.

As shown in figure 4, a piston 8 is located within the main body of the tube 1, between the  
 nozzle 4 and the second end 3. The piston is hollow having a cylindrical wall 10, a circular  
 20 first face 12 with a convex conical section 14 in the centre, and an annular second face 16.  
 Figure 3 shows an end view of these features.

Alternative forms of the piston are possible, for example, as shown in Figures 6, and 7.  
 The first face may be substantially conical in shape. Instead of having an annular second  
 face, the piston may include a ring 17 on the rear surface of the front face.

25 Furthermore, to clean the tube thoroughly, a lip may be provided on the circumferential  
 surface of the piston (not shown).

The conical nozzle and cylindrical tube are moulded as one part from a plastics material, for example high density polyethylene. The piston is then placed in position within the tube such that the space between the piston and nozzle is the predetermined volume of a single portion of ice-cream, for example 125ml. The container is filled with the ice-cream  
 5 through the nozzle and then frozen. The ice-cream is of the normal "soft scoop" type. Once filled, the first end 2 of the container is sealed, as shown in figure 5, with a removable foil cover 18 that adheres to the end face 5 of the tube, protecting the ice-cream from contamination.

The ice-cream is expelled from the container through the nozzle 4 by driving the piston  
 10 8 along the cylindrical tube towards the nozzle 4. The shape of the piston ensures that substantially all the ice-cream within the container is expelled. The container is rigid and does not collapse during the expulsion of the ice-cream. The thicker end part 6 reinforces the container to resist collapse due to the downward pressure applied to expel the ice-cream. Because the tube is cylindrical, the force required to drive the piston is  
 15 substantially uniform.

As shown in figures 6 to 11, the dispenser 20 includes a housing consisting of an upper portion 21 and a lower portion 22. The upper portion 21 includes two vertical flat sides 23 with a curved front plate 24 and top and bottom plates 25,26. Two bearings 27, 28 are located within the upper portion 21, one in the top plate 25 and one in the bottom plate  
 20 26. Mounted within the upper portion 21 there is a pivot pin 30, which is free to rotate about its axis. A handle 32 is attached to the end of the pivot pin 30, which extends outwards through one side of the housing. A sprocket plate 34 is attached to the pivot pin 30 within the housing, for rotation with the pivot pin..

A cylindrical plunger 38 is mounted vertically within the housing for reciprocating  
 25 movement along its longitudinal axis. The diameter of the plunger is slightly less than the internal diameter of the container 1, and the base of the plunger is substantially conical in shape. The bearings 27, 28 allow the plunger to move through the housing. A stop member 40 is attached to the plunger 36, just below the upper bearing 27. A compression spring 42 is provided between the stop member 40 and the lower bearing 28 to bias the  
 30 plunger vertically upwards.

A chain 44 extends vertically through the top plate 25 and is attached at its upper end to a fixing 45 secured to the upper end of the plunger 38. The lower end of the chain 44 is attached to the sprocket plate 34 so that as the sprocket plate rotates, its teeth engage the links of the chain, drawing the plunger 38 downwards, against the compression of the  
 5 spring 42.

The lower portion 22 of the housing is shorter from front to back than the upper portion 21. Attached to the base of the lower portion 22 is a horizontal support plate 48. The support plate 48, also shown in figures 10 and 11, includes an open circular aperture 49 at the front end which is co-axial with the axis of the plunger 38. Around the edge of the  
 10 aperture there is a C-shaped support surface 50 for engaging the end face 5 of the container such that the container is supported in an upright position with the axis of the container in line with the axis of the plunger 38.

A cap 52, shown in Figure 9, is attached to the top of the upper portion 21 of the housing to hide the drive mechanism.

15 The dispenser 20 may either be wall mounted or mounted on a stand 54.

In the rest position, the handle 32 of the dispenser is in a vertical position. To operate the dispenser, the handle 32 is pulled forwards, rotating the pivot pin 30 and the sprocket plate 34. The teeth of the sprocket plate 34 engage the links of the chain 44, drawing the plunger 38 downwards. When the handle 32 is released, the spring return mechanism 42  
 20 drives the plunger 38 upwards to its original position within the housing.

A method of dispensing frozen desserts using the system will now be described. A customer chooses the desired flavour of ice-cream from the variety of flavours on offer. The operator takes a container 1 of ice-cream of the selected flavour from a refrigerator. The protective foil cover 18 is removed and the container 1 is placed vertically in position  
 25 on the support base 48 of the dispenser. A wafer cornet or bowl is held below the container. The handle 32 of the dispenser is pulled forwards, towards the operator, driving the plunger 32 down towards the container. The plunger engages the piston 8, forcing the ice-cream out of the container through the nozzle 4. Expulsion of the ice-cream can be carefully controlled by the operation of the handle, enabling the operator to

obtain the desired presentation. Once the individual portion of ice-cream has been expelled from the container, the plunger can be returned to its original position by releasing the handle. The ice-cream is then given to the customer, and the container 1 is either removed and disposed of, or may be cleaned and refilled.

- 5 As will be apparent, the dispenser is very simple and easy to maintain and use. The dispenser is easy to operate manually since only a relatively small amount of force, about 8-9psi, is required to dispense the ice-cream from a container. The container is a tube, resulting in efficient packing of the containers within a freezer. Due to the shape of the container it is also obvious to customers that the ice-cream needs to be dispensed before  
10 they can eat it. The aperture of the nozzle is large enough to enable ice-cream containing particulates to be dispensed just as easily as smooth ice-cream. Thus this dispensing system enables different types and flavours of ice-cream to be served attractively, quickly and easily. The design of the dispensing system is such that it is not necessary to dismantle any part of the dispenser in order to insert the container. The container is simply inserted  
15 perpendicularly to the axis of the plunger, and placed on the support base of the dispenser. The plunger is then brought into engagement with the piston of the container. After dispensing the ice-cream, the container is just as easily removed and disposed of appropriately. The system also reduces the possible hygiene problems associated with the scoop method of supplying ice-cream since the ice-cream sold is sealed until required, and  
20 the dispenser does not come into contact with the ice-cream.

## CLAIMS.

1. A dispensing system for frozen desserts, said dispensing system including a plurality of containers and a dispensing device, each container containing an individual portion of frozen dessert, said container including a substantially cylindrical tube having  
5 first and second ends, a nozzle means towards said first end, a piston means located between said nozzle means and said second end, said piston means being adapted for sliding movement along the tube, said individual portion of frozen dessert being contained within the cylindrical tube between said nozzle means and said piston means, said dispensing device including a plunger means mounted for reciprocating movement along  
10 a longitudinal axis, a drive means for driving said plunger along said axis, a support means for supporting said first end of said container with said plunger in engagement with said piston means, the arrangement being such that with said container located on said support means, the individual portion of frozen dessert may be dispensed by actuating said drive means, said drive means including a chain attached to said plunger, a rotatable sprocket  
15 member engaging said chain and actuating means for rotating said sprocket member to drive said plunger along said axis.
2. A dispensing system according to claim 1, wherein said actuating means includes a manually-operated handle connected to the sprocket member for rotation therewith.
3. A dispensing system according to claim 1 or claim 2, wherein said individual  
20 portion lies in the range 100ml - 250ml, and preferably 125ml - 200ml.
4. A dispensing system according to any one of the preceding claims, wherein said first end of said container is sealed with a removable cover.
5. A dispensing system according to any one of the preceding claims, wherein said container is rigid.
- 25 6. A dispensing system according to any one of the preceding claims, wherein said container is made of high density polyethylene.

7. A dispensing system according to any one of the preceding claims, wherein the diameter of said plunger is slightly less than the internal diameter of the cylindrical tube of said container.
8. A dispensing device for dispensing frozen desserts, said dispensing device  
5 including a plunger means mounted for reciprocating movement along a longitudinal axis, a drive means for driving said plunger along said axis, and a support means for supporting a container containing frozen dessert in engagement with said plunger means, said drive means including a chain attached to said plunger, a rotatable sprocket member engaging said chain and actuating means for rotating said sprocket member to actuate the dispensing  
10 device.
9. A dispensing device according to claim 8, wherein said actuating means includes a manually-operated handle connected to the sprocket member for rotation therewith.
10. A dispensing system for frozen desserts, said dispensing system being  
15 substantially as described herein with reference to and as illustrated by the accompanying drawings.
11. A dispensing device for dispensing frozen desserts, said dispensing device being substantially as described herein with reference to and as illustrated by figures 6 to 11 of the accompanying drawings.